FEBRUARY 13, 1922

AVIATION

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The Eternal Crank Inventor

IF it is true, as has been claimed, that a genius is but a second cousin to a lunatic, a "crank inventor" must be a first cousin to a real inventor. At any rate he is an interesting species, with a very wide distribution. There is no race, country, or age where he is not in evidence, but his favorite field is unquestionably aeronautics.

Here we have another "vacuum airship" with apparently huge sums of money being spent on it, when it would take but half an hour for any good engineer to prove it absolutely out of the question with present day material. But someone may say "why malign the poor man? After all he may be right and the rest of us all wrong." Quite true, but if such a miracle should occur it would only prove that he was not a *crank* inventor after all. He who is satisfied to condemn an invention with snap judgments based on engineering conventions is himself the crank. The same person would probably class as "Bolshevik" any theories of government with which he was not in sympathy.

The crank inventor, like everything else, is relative. Broadly speaking, he is simply a state of mind. In his elementary form he lacks only a certain perspective. The trouble is intensified by faulty education and undigested "practical experience." But the finished type only seems to appear after prolonged work on some particular idea or design. After such labors the inventor feels himself to be in a state of virtuous superiority. His real mental energy is now confined to persistent elaboration of the same old fallacies. Expert opinions and natural laws are nothing to him. His system, if he has any, consists of ideas first and reasons afterwards. He is incapable of making a quantitative analysis of his own false assumptions, or of taking anyone else's word for it.

The trouble with the crank inventor is not that he makes mistakes but that he sticks to them. The vacuum airship idea was creditable enough for Father Lana in 1670 but in these days it can only be attributed to a vacuum mind.

Soaring Flight

THE interest which is displayed in various quarters in this country toward the problem of motorless flight—a convenient term including both gliding and soaring flight—is highly gratifying to those who believe, as we believe, that motorless flight is bound to become an important phase of aviation. Experiments are being conducted in various sections of the country, and the main difficulty seems to be that the various experimenters have but inadequate means for gathering reliable information as to what has been actually achieved elsewhere, and which types have proved the most satisfactory soaring machines.

The article dealing with this subject which appears in this issue endeavors to supplement this deficiency. On the other hand there seems to be an urgent need for a national association of "motorless fliers," which would centralize the now scattered efforts and keep its members informed of the latest developments. Such an association might take the shape of a federation of the existing model airplane and soaring clubs. We understand that one such program is already under way, and is to take shape before long, so an announcement may be looked forward to in the near future.

Aircraft as a Civilizing Medium

THE Washington Conference, just closed, has added a very important thought to the concept of the function of aircraft. The report of the Committee on Aircraft said in part; "It must be distinctly understood that if the Conference decided to limit the development of commercial aircraft in order to retard the development of air power, the immediate result will be the retarded development of means of transportation and communication which will itself, if unrestricted, largely act to bring about the same result, the removal of some of the causes of warfare. * * * * * * Any limitation as to number and character of civil and commercial aircraft, heavier-than-air or lighter-than-air, which is efficacious to hinder their utility for war purposes, must interfere disastrously with the natural development of aeronautics for legitimate civil and commercial enterprises. To limit the science of aeronautics in its present state is to shut the door on progress."

This considered opinion presents a view of the function of aircraft as a civilizing medium that is frequently forgotten or neglected. Modern civilization is vitally dependent on transportation and communication. The present organization, furthermore, demands an ever increasing rate of speed. In the transportation of intelligence we have already reached the theoretical limit, the speed of light. In the trasportation of food, manufactured goods and people we are just beginning to realize the possibilities. The higher the speed of transportation the easier life becomes on the earth. Also the understanding between peoples becomes greater in the same ratio, and peace is dependent on international understanding and cooperation.

Flying Meets

THE coming year will undoubtedly show us a great many flying meets all over the country. Many of these meets will be only a few days apart or at most a week or two. This brings up the thought that many of the contestants and exhibitors will fly their machines from one to another of these flying meets. If the dates of the various meets were properly arranged it would be possible for a company to enter a set of machines in practically all the meets during the flying season by flying them from one meet to another. This point should be taken into consideration by chambers of commerce, Aero Clubs, etc., who are contemplating arranging a flying meet in their locality.

Lessons of the Fall Flying Meets

Experience of Mineola, Kansas City, Omaha and Baltimore Meets Teaches Value of Strong Central Organization and Attention to Details

By W. Wallace Kellett

The significance of the important flying meets held last fall at New York, Omaha, Kansas City and Baltimore hardly seems, to one who attended each of these meetings, to have been sufficiently emphasized. As a matter of fact, the success of every one of these meets, assured by the large attendance, the many new and advanced types of commercial airplanes which participated, the great number of miles flown almost without accident, should be of the greatest encouragement to those actively connected with aviation and a revelation to those who do not yet know that flying is here.

Value of the Experience

The value of the experience gained cannot be over-estimated. That the general public is ready and willing to be educated to flying, and furthermore, to pay for this education, was proven beyond doubt. The fact that aviation exists today as a practical and useful part of the life of every community can no longer be denied. That the local Flying Club or, Chamber of Commerce in every live city or town of any size in the United States can hold a flying meet with every assurance of success—financially profitable and in countless other ways to the best interests of the city, was thoroughly demonstrated. The cities and town which start now to attract the flying public, by means of their airports, their flying facilities and their hospitality to air travelers, will never have good cause to regret these expressions of good-will toward the increasing number of those who love the air—and that in the not distant future.

The following figures tell what happened last Fall at the four feature meets—New York, Kansas City, Omaha and Baltimore. Successful local meets were also held during the spring and summer in many other places, figures for which are not included here. Red Oak, Iowa, for instance, beat New York's attendance figures—and Red Oak is hardly known to the general public except as the "place they had the aero show" and the Air Meet at Concordia, Kan., with its many events with cups and cash prizes, attracted more machines than Baltimore. The writer is attempting to cover, however, only the four final meets of the season which he attended.

Attendance:—New York, 8,000; Kansas City, 100,000; Omaha, 40,000; Baltimore, 6,000. Total 154,000. Average daily attendance, 16,900.

Number of airplanes participating:—New York, 30; Kansas City, 72; Omaha, 60; Baltimore, 25. Total, 187.

Roughly speaking, almost 200 airplanes flew over 100,000 miles during the six weeks of these meetings alone. The great majority were privately owned and operated. At this rate, providing only thirty two-day meets are held during 1922 (and this is not an exhorbitant number) the total attendance will exceed 1,000,000 persons and the participating machines will easily fly 700,000 miles.

As a matter of fact, a series of thirty flying meets, at the rate of one meet per week, would be about all that, under present conditions the average manufacturer or exhibitor would be able to participate in this coming season. This indicates that the cities which are the first to announce their plans will doubtless secure the most important and the most interesting exhibits as well as the largest number.

Requirements of a Successful Flying Meet

Let us review the meets held last fall, and see a few of the necessities as shown by past experience. Let it be said here that none of the criticism of the fall meets is intended to be personal. It is made only with the idea of constructively benefitting future meetings.

The more uniform these meetings are made in organization and in program, the better they will be, not only from the viewpoint of the spectators and the participants, but also of the local Flying Club or Chamber of Commerce, which conducts them. Only by a free exchange of ideas based on experience can this uniformity be achieved. New York, for example, may learn from Kansas City, Los Angeles or Dallas.

The New York Meet, known as "Aviation Day at Mineola" was held on Oct. 16, 1921, under the auspices of the Aero Club of America. There was no regular program of events and no cash prizes were offered. A trophy was however awarded by the Wright Aeronautical Corp. for the best demonstration of air transport. Competitors for the Wright Trophy were permitted to carry out the tests they considered appropriate, which some did on Saturday, the day preceding the meet.

An admission fee was charged, the proceeds going to the Aero Club for club house and other needed improvements. Nine manufacturers exhibited fifteen different types of commercial airplanes and thirty machines in all were present.

Arrangements for handling the crowd were good. Ropes were stretched around the border of the field behind which the spectators were kept. The machines on exhibit were lined up about 30 ft. from the ropes, although not enough attention was paid to keeping them in their proper places once the flying started, and some of the machines, after flights, did not return to their original places in the line.

From the judges' stand, a Magnavox, very efficiently operated, announced performances as they were made, and kept the spectators informed on the machines in the air, taking-off and landing. The Magnavox is an electrically operated announcer by which one man may address a very large gathering, his voice being heard distinctly at a considerable distance.

At New York the airplanes, the pilots, the spectators and perhaps even the Magnavox were over-worked. This was because there was no set program of events and demonstration flights to be closely followed out.

In order to fill in dull moments, the pilots took the air continuously. Sometimes three or four very interesting "stunts" were going on at the same time, the spectators being obliged to transfer their attention from one to another quite rapidly.

Advantages of a Complete Program

The advantages of a complete program are numerous. With a less amount of actual flying, still a better "show" is given the onlookers, and they are better able to follow and understand what they see. There is less confusion among the judges and participants, and flying rules are more easily enforced, thus reducing the chance of accidents. It was demonstrated quite clearly that the program of events of future meets should be made with the view of having as much flying as possible in the limits of, or directly over, the field. Even during a race around a pylon course, some sort of airdrome flying should be arranged for the spectators.

In addition to the need for a standard program and regular events, the later meets proved that New York, as well as any other city holding a flying meet, would do well to offer as much in cash prizes, cups, etc. to the contestants as possible. In addition to encouraging contestants from distant points, and increasing the number of entrants, substantial prizes assure greater publicity, both local and national. Ten or twenty thousand dollars in prizes may obtain thirty thousand dollars worth of publicity and a crowd of perhaps forty or fifty thousand people. Crowd psychology is quite interesting in this respect. Spectators will travel many miles to see men box, or race, or contest in some way for thousands of dollars in prize money. The same performances, without the glamor

of gold, would attract a much smaller patronage. So it is, that important rewards for performing in the air should also attract widespread attention and greatly increase attendance, thereby repaying the original investment many times over.

New York was generously treated by the Government in the award of flying fields during the war. In commercial aeronautics it must win its place through its own efforts as every other city must do. In doing so, it should not overlook the fact that within the next few years the aireraft industry will blossom forth into proportions comparing quite favorably with the automobile, the railroad and the steamship industries.

American Legion Flying Meet

The American Legion Flying Meet at Kansas City, Mo., conducted by the Flying Club of Kansas City in cooperation with the American Legion was a four-day meet, held from Oct. 31 to Nov. 2.

In completeness of organization (both of personnel and material), hospitality to participants, and all-around efficiency the men of the Kansas City Flying Club set a record which cannot be surpassed and is not likely to be equalled at a flying meet for some time to come. Needless to say, the Kansas City Meet was a tremendous success.

An admission fee was charged, proceeds going to the Kansas City Flying Club for use in the establishment of a permanent field, and as a result it is now assured that Kansas City will have an airport in fitting with the importance of that city.

With a schedule of events for almost every type of machine, substantial cash prizes and valuable trophies were offered. They were well contested for. Seventy-two machines of about thirty different makes or types were present.

Roads leading to the fields were closed for a mile or so away, so that the free list was considerably reduced. *This system should be followed whenever possible.* The simple process of closing all approaches some distance away from the field, and holding the most interesting events directly over the field is the best and only sure way of securing a large paid attendance.

The crowds were perfectly handled, not only by the local police and state troops, but also by members of the Flying Club, who voluntarily subjected themselves to real military discipline within their own organization, in order to conduct the meet properly.

A six-foot barbed wire barrier kept the spectators from over-running the field. The seventy-two machines were lined up facing the barrier the line running the entire length of the field. Each day at 5 o'clock all flying was called off and the machines were put in their proper places in the line. The spectators were then permitted to come on the field and inspect the various types of planes at close quarters. This excellent idea goes far toward educating the public, and also holds the crowd till the very end of the program.

The Magnavox was kept busy and the events were held quite promptly in accordance with the program. Here again it was realized that everything possible should be done to avoid a single dull moment to the spectators.

Importance of Efficient Staff

The Kansas City meet demonstrated the importance of a willing and efficient personnel, properly organized and directed. From the motorcycle squad (a very important section of a flying meet) which dashed continuously at break-neck speed to and from all parts of the field, to the housing and transportation committees which functioned at the downtown headquarters, there was a spirit of cooperation which overcame all obstacles. This meet was undoubtedly the best flying meet of the year, and the organization responsible for its success is assured of the full cooperation of exhibitors and participants when the time for their 1922 meeting arrives.

In view of the successful Kansas City meeting, the American Legion has decided to conduct a flying meet in conjunction with its Annual Convention in the future. The next Legion Convention will be held in New Orleans in the Fall of this year. The Flying Club men of this city have their work cut out for them in staging a meet to equal that of 1921.

Almost all the pilots and machines at Kansas City also took part in the Omaha Meet, which was held by the Aero Club of Omaha Nov. 3, 4 and 5. This meeting was held in conjunction with the International Aero Congress. The main feature was the Pulitzer Trophy Race, a speed classic, but aside from this, the Larsen Efficiency Contest and several other events were run off. The weather was perfect for flying and the attendance good, so that the meet must have gone far toward achieving favorable results for the club.

Probably fifty machines flew from Kansas City to Omaha on the afternoon of Nov. 3 and the morning of Nov. 4. All arrived without incident and in such a matter of fact way that the fact that over one hundred people flew a total distance of approximately 10,000 miles to come to Omaha was hardly mentioned. Others also flew from points as far distant as Minneapolis almost without notice.

The Omaha meet itself was marked by a certain lack of cooperation and attention to details which was surely detrimental to securing the best results. The importance of careful organization and well thought out preliminary preparations was clearly shown. Omaha suffered much from a lack of personnel—that is, a sufficient number of trained men working in entire accord and with good understanding among themselves, each one doing his allotted task, big or small, for the good of the whole.

One Man in Full Authority

Here was emphasized the absolute necessity of having one man with full authority in undisputed charge of a flying meet. In the final analysis every flying club contemplating a meet of more than extremely local interest should avail themselves of the direct personal supervision of a member of the contest committee for several weeks before the meet, at least to form the organization and plans necessary to assure complete success. No unjust criticism is directed here to those men who pulled the Omaha Meet out of the fire, so to speak, and made it a real success. They performed almost superhuman tasks in the short time remaining after they took charge, (a week or so before the meet). There were hitches throughout, only because it requires at least three months of intensive effort on the part of an organization to stage a real flying meet. Clubs or others contemplating doing so this season would do well to allow at least this much time for preparation.

An admittance fee was charged, the proceeds going to the Aero Club of Omaha. A great deal of money was lost by not having the approaches to the field properly controlled. Thousands saw the meet without paying admission.

The crowds were fairly well handled, though at times spectators walked across the field, due to an insufficient number of guards or misunderstanding of orders by the guards. One cause of embarrassment to contestants was that proper identification buttons were not issued, so that on several occasions men who rightfully belonged on the field were compelled to make explanations to the guards. Contestants, mechanics, etc. at meets should always be distinctly tagged, and those not so identified should be strictly kept from that part of the field reserved for the judges, machines and fliers.

There was some delay in running the events according to schedule. During these periods, various pilots voluntarily gave exhibitions and demonstrations for the spectators. In making up the program of a meet, it would be well to provide something to fill in every minute, even if this consisted of only one machine in the air. At Omaha, as at Kansas City, it became apparent that some amusement on the field itself should be provided for the spectators during the races, with the exception of the Pulitzer Trophy race, which held everyone's undivided attention.

Consider the Spectators

The sixty machines at Omaha were kept on the far side of the field, probably one quarter mile away from the spectators. It is much more interesting to have them lined up, before the crowd, so they may be seen and studied close at hand. Aviation meets are made possible by the spectators, and they should be considered first.

The fact that flying rules were not enforced, some of the events delayed, and some confused or improperly controlled, was simply because it was a physical impossibility for the small body of men who conducted the meet to be in several places at one time. The captain of a flying meet needs a host of capable lieutenants.

Baltimore Meet

The Second Annual Aero Exhibit of the Baltimore Flying Club, Baltimore, Md., was scheduled for Dec. 4. Almost all the exhibitors and machines arrived on Saturday, the third, which was an excellent day for flying. A blinding snow storm began Sunday morning and continued all day, so that it was impossible to hold the meet as scheduled. It was therefore postponed till Dec. 10. By this time, a great deal of the enthusiasm of the general public was lost, and some of the exhibitors also found it impossible to attend the postponed meet.

All meets should last at least two or three days to avoid occurances of this kind. A two or three day program does not add greatly to the expense, and practically assures at least one good flying day. A meet continuing two or more days will receive greater publicity, will be more widely attended, and will be a much greater financial success than a one day meet.

There were no cash prizes, scheduled events or admittance fees at Baltimore. These facts probably limited the attendance of out-of-town exhibitors. The twenty machines present gave interesting demonstrations, and several novel feature events pleased the crowd. One of these was a relay race, in which the passenger was compelled to change machines each lap of the course. Success in this contest depended upon the skill of the pilot in landing close to his team mate, and the agility and fleet-footedness of the passenger in changing ships. This is an interesting event in any program.

The Baltimore Flying Club has one of the best and most completely equipped airdromes of any club in the country. This equipment places Baltimore well up among the leading cities in commercial aviation. The excellent position of Baltimore as an aviation center is due to the generous cooperation of some of the leading business men of the city, the Air Service Unit of the Maryland National Guard and the members of the Baltimore Flying Club.

The field is large and well cared for. It already has five large hangars and a repair shop. There is also a comfortable and attractive club house which is very popular. Indications are that flying is fast becoming one of the major outdoor sports of the city and field days will probably be held frequently this year. The men who are responsible for this progress at Baltimore are capable of holding a big flying meet at any time with assured success.

One criticism of the Second Annual Aero Exhibit was that it came in December instead of in May or June. It is in the interests of the local flying clubs, the spectators, manufacturers and participants to hold these meets in the months of May, June, July and August rather than in the fall. Aviation Day at Mineola, which this year falls on April 30, should be the beginning of a series of meets in all parts of the country.

Conclusion

With the proper coordination and arrangement of dates, aviation meets will rapidly develop into nation-wide aerial tours, contestants and exhibitors packing up and flying in flocks, like great migratory birds from one meet to another as it happened at Kansas City and Omaha—accompanied by an ever-increasing number of plain aerial tourists, owners of machines seeking pleasure and a view of the country.

An excellent beginning was made in 1921. Let us make 1922 an even greater year.

Navy Pigeons Win Prizes

Ten homing pigeons from the Naval Air Station, Hampton Roads, entered in the recent Poultry Show at Norfolk carried carried off the honors.

In competition with fifty other birds entered, that station secured nine prizes, four of which were first prizes, three second prizes, one third prize and one fifth prize. In addition to the prizes mentioned, the station received a large silver cup for having the best male bird entered in the show, also a small silver cup for the best display of pigeons. A cash prize was awarded to a pigeon of this station's loft as being the best female bird.

Boston C. of C. on Air Laws

The need of Government regulation of aviation is emphasized in a report of the Boston Chamber of Commerce, issued recently, which advocates the passage of the Wadsworth-Hicks bill now before Congress. This bill has the approval of the Army and Navy Air Services, the Post Office Department and all recognized flying organizations.

For some time, airmen have frowned upon the so-called "gypsy flier," who, armed with an antiquated army plane, tours the beach-resorts during the summer, charging ten and fifteen dollars for five or ten minute "hops." Often the plane is not only structually unsound and worn, but the pilot incompetent. He is frankly seeking the money in the game, while the layman, anxious for a ride in an airplane, "takes a chance," and in this case it is often a real chance that he takes. There are few aerial traffic regulations in the United States, the result being that these gypsy fliers are at liberty to do pretty much as they please until their planes crash. These accidents invariably attain widespread publicity and the public attributes the deaths or injuries that result to aviation.

The chamber's report on this matter is in part as follows:

"Aviation is essentially interstate in its character. The speed of the airplane is such that it can readily cross State boundaries. Forty-eight different laws regulating the use of aircraft would cause far more confusion than the forty-eight different sets of laws regarding automobiles.

"But the trouble at present is not so much that there are forty-eight laws, but that there are only ten or a dozen States that have any laws at all governing aviation—and in practically all cases these laws were made while aviation was not far developed, and are not adequate to care for the present situation. Practically the only places having satisfactory aircraft regulations are Chicago and New York city, both of which have passed excellent city ordinances which, however, are limited in their jurisdiction to the area of the city.

"The failure of the various States to provide adequate laws regulating aviation endangers life and property, and is a distinct hindrance to the development of aviation. By failing to provide for registration of pilots and machines after careful examination and subject to frequent inspection, it permits the so-called "gypsy flier" to operate at will. Such a flier may or may not be a skilful pilot, but in either event, in nine cases out of ten, he flies a former war machine, which was not fully overhauled after its war use, and which has not had proper care since then. Such salvaged machines are distinctly dangerous, yet they are used in large numbers at beaches and similar resorts to take passengers on "joy rides," with danger to the life of the passenger, who does not know the machine is unsafe; to the lives of persons on the ground; and to property. In case of accident, there is little chance of redress.

"Every accident receives a great deal of publicity in the newspapers. The public gains the impression that aviation is an extremely dangerous art, suitable only for war uses, or for the most daring. Actually, flying in a properly inspected and cared for machine, with a good pilot, under regulations forbidding "stunting" and similar reckless flying, is as safe as riding in an automobile.

"In Europe the same situation held true to a large extent, and now every country that has any aviation industry worth mentioning provides governmental regulation of the operation of aircraft.

"Realizing the need for such regulation, those most interested in the development of the art started in shortly after the armistice to make a careful study of the question. This resulted in the bills introduced by Senator Wadsworth and Mr. Hicks.

"Your Committee on Post Office and Postal Facilities firmly believes that federal control of aviation is essential to the commercial development of the industry and to the proper protection of life and property. The Wadsworth-Hicks Bill, as outlined above, appears to be the most practical and most satisfactory means of obtaining such regulation.

"Your Committee on Post Office and Postal Facilities recommends that the Boston Chamber of Commerce endorse the bills to create a Bureau of Civil Aviation in the Department of Commerce, and that the committee be authorized actively to urge the passage of this measure."

Soaring Flight and Soaring Aircraft

A Review of the Progress Achieved in Soaring Flight with Considerations of its Practical Possibilities

The following article has been compiled in answer to many letters of inquiry from readers of AVIATION *relative to the significance of the soaring experiments now going on in Germany, the results obtained, and the construction of the most successful German soaring aircraft. The considerable interest elicited in this country by this subject is in our opinion fully justified. France and Switzerland are already following Germany's lead in organizing soaring competitions, and a German soaring machine was recently imported into England for experimental purposes. While a certain number of soaring experiments are proceeding in this country, there has so far been a lack of coordination between the various efforts, on one hand for lack of information, on the other, for want of competition. The present article endeavors to furnish this information. The data published are exclusively from German sources and may be considered reliable.*—EDITOR.

The term "soaring flight" describes the kind of flight practised by certain species of birds (albatross, vultures, eagles, seagulls, etc.) when they progress through the air in a horizontal direction without any apparent expenditure of energy, that is, without flapping their wings. The veracity of the observations relating to soaring flight were for a long time izontal direction without any apparent expenditure of energy, is necessary to produce locomotion. Octave Chanute, who also was a student of bird flight, said in this connection that "when the feat of soaring is first witnessed, the mind doubts the evidence of the eyes, and seeks for some undetected movement to account for the forward motion." Today, however, there does not remain the slightest doubt that certain kinds of birds do fly in this manner, and fly for considerable distances.

Observers are generally agreed that no soaring ever takes place in calm air, hence it appears that the birds derive their ability to soar from the wind.

Gliding Flight and Soaring Flight

Soaring flight is frequently confused with gliding flight, whereas the two motions are absolutely distinct. In gliding flight the airplane, or the bird, continuously loses altitude, the length of the glide being proportional to the height above the ground, and inversely proportional to the wing loading, that is, the load carried per unit of wing area. In soaring flight, on the other hand, the bird or the machine progress horizontally, or even on a rising slope, deriving their support from the internal energy of the wind.

It is sometimes claimed that soaring flight can be achieved by the agency of ascending air currents. The theory in this case is that if a wind is blowing in an upward direction at a speed which is higher than the rate of decent of the machine, and the slope of the wind is steeper than the machine's gliding angle, than the soarer will rise until it emerges from the region of "upwind," when it will descend in a glide. By repeating this performance it is obvious that a soaring machine could, now climbing with an upwind, now gliding with the energy stored up during its rise, achieve more or less horizontal flight. Now, while it is true that soaring birds often utilize ascending air currents for "taking off", it is no less certain that these birds do not fly in the undulating manner which the sole use of upwinds would necessitate. Hence it follows that they utilize still another source of energy in the wind. This energy is believed to be furnished by the irregularities, or rapid changes in speed and direction, in the wind. Eduard Rumpler, the German airplane manufacturer, who has made an exhaustive investigation of this subject divides the irregularities in the wind into two kinds, "primary fluctuations" and "secondary fluctuations". He calls primary fluctuations the strong gusts of rapidly changing force and direction which occur in some regions under certain atmospheric conditions. These gusts the soaring birds are believed to make use of for horizontal flight by equalizing the wind fluctuations, that is, by presenting the greatest resistance to a gust, and the least resistance in the ensuing lull. In this manner the bird stores up energy in a gust, and spends it in a lull, the energy accumulated by it being equal to that which the wind loses by the resistance of the bird.

The secondary fluctuations in the wind, which Herr Rumpler distinguishes from the primary fluctuations, are of a more particular, and hitherto hardly known, nature. It appears that, irrespective of the gustiness of the air there exists in the

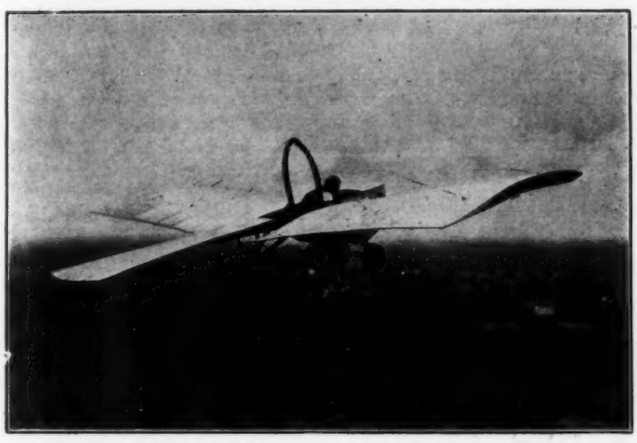


Fig. 1. The Richter glider, in which the pilot took off with his legs at the 1920 Rhön meet

aerial ocean a state of pulsation, or vibration, which sets up an extremely small, but continuous wave motion. Herr Rumpler states that he has succeeded in measuring the frequency of this pulsation, although he does not specify the kind of instrument he employed for this purpose. The average number of these pulsations is, according to him, 15 per second, or 900 per minute. How these secondary fluctuations affect soaring flight is still a matter for speculation, but it is reasonable to suppose that they cause the bird's feathers to vibrate, and so produce propulsion in the manner of the "fish-tail" propellers which have been experimented with for the production of power from the wave motion of the sea.

If the birds actually derive their soaring energy, or at any rate a portion of it, from this phenomenon, the problem of artificial soaring will be considerably complicated, for a mechanical reproduction of vibratory feathers would seem to involve some very serious difficulties. Indeed, no known metal or tissue has the combined strength, light weight, and elasticity of a bird's feather, although one inventor, Dr. Nimfuhr, suggests absorbing the secondary fluctuations by pneumatic means (see below).

A German View of Soaring Flight

It seems, however, necessary to point out that the difficulties involved in soaring with the assistance of ascending air currents and gusts are difficult enough that the problem should not be further complicated *in the beginning* by the addition of little known factors. In this connection considerable interest attaches to a statement anonymously published by our London contemporary *The Aeroplane,* and attributed to a person in close touch with some of the more successful German soaring experts. This statement reads in part:

"German experience has shown very clearly that success in soaring flight is in the first place a matter of piloting and of a suitable wind, and only in a second degree of the qualities

of the machine. Bad piloting, even with an excellent machine and the best possible wind conditions, has never yet produced satisfactory soaring. Equally the best handling of the best machine yet produced has not yet given soaring flight in an unsuitable wind.

"It is essential that at the same time one should have the three indispensable conditions of (a): A suitable wind, whose internal energy suffices to produce gliding; (b) Piloting sufficiently skilful to utilize this internal wind energy; and (c) A machine of really low resistance and, very particularly, of high maneuvering qualities. As to the wind there are three types which render soaring possible: first, winds with vertical components due to the slope of the ground; second, gusts in a horizontal or mainly horizontal wind; and third, winds of varying direction at varying altitudes.

"Soaring in a vertical wind should not properly be described as soaring. It is really only gliding flight in a vertical wind. Aerodynamically and mechanically such flight is identical with the ordinary gliding flight, with the sole difference that the wind has a vertical velocity, and to call it "soaring" is to utter an untruth. To be honest, this method of keeping one's height will never lead to true soaring and its only value seems to be that of giving experience in pilotage and aiding the development of the machines. True soaring flight, which is the objective of the present German experiments, is flight by the use of the energy of a gusty wind, generally horizontal. Klemperer's 13½ min. flight, Martens' 15¾ min. flight and Harth's 21½ min. flight have, it is claimed, been generally of this type. Klemperer's and Harth's flights were actually combinations of this type of flight and of ordinary gliding. The perfect type of soaring flight is characterized by the fact that it may take place over horizontal or practically horizontal ground (see the illustration showing Koller on the München monoplane).

How to Pilot a Soaring Machine

"As to the actual piloting needed for such flight, it sounds perfectly simple. It is in fact not simple at all. The apparent simplicity thereof is as follows:—Variations in wind speed, in the form of gusts, represent energy available for soaring. If one can succeed by any maneuvers whatever in reducing the variation of the wind, that is if one can make the wind speed more nearly constant, then one will necessarily set free some of the internal energy. This energy, then, must take up a new form—as, for instance, heat or a vertical air velocity.

"From this simple consideration one arrives at the equally simple theory of pilotage. One must so pilot in a wind of great gustiness that that gustiness be reduced as much as possible, and that the energy thus liberated is used to do the work necessary for flight. This still seems quite simple. The ideal of pilotage is to so maneuver that there will be as nearly as possible a constant wind speed behind the machine.

"The difficulties of the actual piloting are due to the fact that one does not know beforehand the structure of the wind, the form, periodicity and duration of the gusts. The most desirable type of gust is that which has a long period of increasing speed followed by one of constant maximum speed, a further period of decreasing speed and a final period of constant minimum. It is necessary that the difference between maximum and minimum speed be as great as possible. When one has such a wind available, piloting a soaring machine is not too difficult. During the first period (increasing wind) one will fly head to wind, and should steadily gain height during this maneuver. At the second period of maximum and constant wind one must turn at right-angles to the wind. Generally it will be impossible to avoid some loss of height in this period. At the beginning of the third period the machine must be turned tail to wind. As the wind is now diminishing in velocity from behind the machine, the speed of the machine through the air is effectively increasing and it is again possible to gain height. During the fourth period of constant minimum wind one must again turn at right-angles to the wind.

"By flying in this manner one diminishes the differences of wind speed and utilizes the energy of the gusts. This is the essence of piloting a soaring machine. Therefore it is necessary to know the structure of the wind, to recognize in advance the nature of the gusts, in fact to see the gusts before they reach one, and the best preparation for such piloting is the study of the structure of the wind and of gusts.

"To succeed in gaining energy from the wind in this manner it is necessary that the machine used should possess very perfect controllability, both as to elevators and to rudders. The use of wings of variable incidence has been found to give more excellent results as regards gaining energy in this manner than the usual method of using elevators. Theory indicates the possibility of soaring in the third type of wind mentioned, that whose direction changes at different levels, but so far practice has not borne out theory, and for the moment this type of soaring is not discussed."

The German Soaring Movement

The difficulties experienced in soaring which are set forth by the German correspondent of *The Aeroplane* will better enable our readers to appreciate the value of the various performances which were made in Germany during the past two years. The results obtained at the Rhön soaring competitions of 1920 and 1921 were at the time recorded in AVIATION, but it seems interesting to return to this subject in detail so the reader may obtain a general view of the German soaring movement.

The motive power behind this movement, which was launched early in 1920, is Oskar Ursinus, editor of the German aeronautical weekly *Flugsport*. Owing to his untiring efforts, which were, and still are, powerfully seconded by various aeronautical associations as well as by the scientific and manufacturing circles of the German aviation world, a contest for gliding and soaring machines (motorless airplanes) was held in the summer of 1920 in the Rhön hills, near Frankfurt am Mein. Prizes totalling 25,000 marks were offered the competitors for the best performances, chiefly in regard to the longest distance covered without alighting, the greatest number of individual flights (to show safety in handling), and the lowest rate of descent, or "sinking speed", as the Germans call it. No restrictions were placed upon the design of the competing machines except that they were to be devoid of a mechanical motor.

Twenty-four machines of diverse types entered this contest, and with a few exceptions their outlines resembled the gliders which the early pioneers of aviation employed for their experiments, although some of them looked more like up to date airplanes minus the motor.

The results of this first contest were not particularly startling, and for this reason the whole affair did not attract much attention outside of Germany. It is true that one contestant, W. Klemperer, made a glide lasting 2 min. 22 sec., but in view of the progress made in aerodynamical research since gliding experiments went out of fashion, so to speak, there was nothing sensational about this performance. It may be recalled in this connection that in the fall of 1911 Orville Wright remained in the air on a motorless glider for 9 min. 54 sec., hovering most of the time at a height of 200 ft. This experiment took place over the historic sand dunes of Kitty Hawk, N. C., where the Wright brothers made their early gliding experiments, and later the first controlled power flight in the world.

The Aachen Glider

Klemperer's machine, however, afforded an interesting example of the influence of modern aerodynamical knowledge on glider construction. This glider, which is generally referred to as the Aachen, was built under the direction of Prof. von Karman and W. Klemperer by a group of students of the technical high school at Aix-la-Chapelle (Aachen), and was entered in the first as well as in the second Rhön contest by the Aaachen Aeronautical Society. Hence the name. (Fig. 2).

The Aachen glider is a thick wing monoplane of the type developed for power flight by Prof. Hugo Junkers, of Dessau, and known in this country as the JL6 monoplane. The entire machine is highly streamlined, which reduces parasite resistance to a minimum. The wings, the forward portion of the body and the landing gear are built up as a single unit of plywood girder work, while the rear portion of the body with the tail unit forms another unit. This system of construction facilitates storing and transport by road. The wings are of

one piece and are built on three wing spars and a suitable number of ribs. The main (central) spar is of box construction, while the secondary spars are of I section. The two inner ribs of both sides are of biconvex section, while the following ribs are almost flat on the under side and highly cambered on the upper side. The tips of the wings are slightly reversed in camber for stability. Non-balanced ailerons are fitted on a rotational axis which slopes forward and outward to utilize to the maximum the end losses.

The pilot is seated in the nose of the machine, above the wings. Control is by means of cardan lever and rudder bar.

The landing gear consists of two rubber sprung skids the supporting structure of which is streamlined. The tail surfaces consist of tail plane, elevator, tail fin and rudder. Neither elevator nor rudder are balanced. A tail skid protects the tail unit against rough ground. The whole frame-

Fig. 2. The Aachen glider soaring on an even keel

work of the machine is covered with a specially doped waterproofed fabric. The wings weigh 0.32 lb. per sq. ft. of area.

The 1921 model is similar in construction, but it is somewhat heavier to take care of rough landings. Its dimensions are also smaller as may be seen from table I. It is on this machine that Klemperer made, after the second Rhön meeting, his famous cross country flight of 6 miles in 13 min. 3 sec., which was related in the Oct. 10, 1921, issue of AVIATION.

The best performance of the Aachen glider at the 1920 Rhön meet consisted in a glide of 6000 ft. in 2 min. 22 sec, and in a mean rate of descent of 120 ft. per min. which it achieved over a distance of 725 ft. The mean speed of the wind during the latter flight was between 50 and 60 ft. per minute.

The Second Rhoen Meeting

These results seemed sufficiently encouraging to the Germans to call a second gliding and soaring meeting in the Rhön hills in the summer of 1921. The large number of freak machines which had appeared at the first competition, and the lack of results achieved by them, prompted the organizers to provide for an elimination contest in which competitors had to qualify before they were allowed to participate in the meeting proper. These trials consisted of a gilding flight of at least 1000 ft. length, or of one of at 30 sec. duration. The prize money totalled 100,000 marks, or four times the amount offered 1920. In this was included a Grand Prize of 30,000 marks which was to be awarded to the contestant who would make a gliding or soaring flight exceeding 5 min. duration with a total loss in height not exceeding 164 ft. As the latter requirement gives a mean sinking speed of 33 ft. per minute, and the best performance made at the 1920 meet was 120 ft. per minute, it will be seen that the Germans showed considerable optimism with regard to the improvement in performance that might be expected within a year.

The choice of the Rhön hills as the site of these soaring competitions was due to the frequence of upwinds and gusts around a hill 3000 ft. high, the Wasserkuppe, which rises up in a plain bare of trees or other natural obstacles. These conditions were eminently favorable to gliding and soaring experiments, although on the other hand the shape of the ground tended to vitiate judgment regarding true soaring flight, for the ascending air currents would obviously permit of horizontal flight which yet would not constitute soaring.

Forty-five machines entered the second Rhön meeting, but of the thirty-four which actually showed up only eleven passed the elimination trials. The entries did not differ to any great extent from the machines of the preceeding contest, at least not the ones which made the best performances. The three outstanding types, which won most of the prize money, were the München glider piloted by Karl Koller (Fig. 3), the Aachen glider piloted by W. Klemperer, and the Hannover glider piloted by Arthur Martens. The München glider won the distance contest with a flight of 2.5 miles in 5 min. 5 sec., the Hannover glider finished second with a flight of 2.2 miles in 5 min. 33 sec., and the Aachen glider got third place for a flight of 1.6 miles in 4 min. 31 sec.

The contest for the slowest mean sinking speed ended in a tie between Koller (München) and Klemperer (Aachen) both

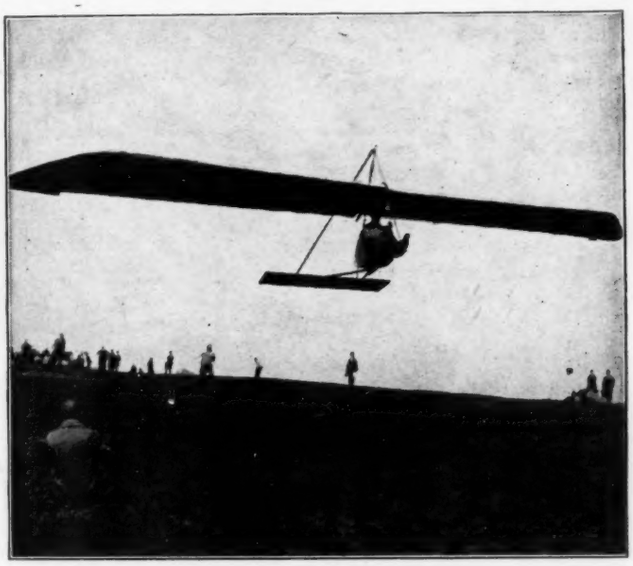


Fig. 3. The München glider which Koller flew in the 1921 Rhön meet

of whom made an average of 80 ft. per minute. As this figure fell considerably short of the performance stipulated for winning the Grand Prize (33 ft. per minute), the latter was not awarded. The progress made with respect to 1920 was nevertheless encouraging, for the slowest rate of descent, made by Klemperer, was then 120 ft. per minute.

The Muenchen Glider

The excellent performance made by the München glider caused considerable comment among German soaring experts because this machine is constructionally the very opposite of the Aachen glider which it beat on long distance, and with which it was tied for mean rate of descent.

The München glider takes its name from the Aero Club of Munich (München), Bavaria, which entered it in the second Rhön meeting. Its design and construction are due to members of this club. In view of the performance of this machine it is interesting to note the points in which it differs from the Aachen glider. While both machines have the same wing area, 162 sq. ft., the München is 20 lb. lighter than the Aachen, weighing 123 lb. as against 143 lb. as against the latter. The München has also about five feet more spread than the Aachen, but as both machines have the same wing area it follows

that the München has a smaller chord, that is, a higher aspect ratio than the Aachen.

Not the least remarkable point about the München is that although no attempt has been made in this machine toward streamlining, and the Aachen is a low resistance monoplane of Junkers appearance, the two gliders should have been tied for first prize in the contest for the smallest mean sinking speed. It might be expected that the Bavaria with its high parasite resistance would have a much smaller mean sinking speed, the more so as it is 20 lb. lighter than the Aachen, but the element of piloting must also be taken into account in such a comparison.

The general arrangement of the Bavaria is that of a "parasol" monoplane in which the wings are connected with the tail by two V outriggers opening toward the tail. The apices of these Vees are attached to a vertical mast which is in the center of the wings and protrudes both above and below them. From the upper end an oblique strut runs to the landing skid which is connected further aft with the lower end of the mast. The wings incorporate a variable incidence device. The pilot is seated below the wings, just aft of the lower end of the mast, in a half streamlined nacelle. The tail unit comprises an elevator, a vertical fin and a balanced rudder, but no tail plane. The wings are warped by means of wires running over the upper and lower ends af the central mast. (See specifications in Table I.).

The Hannover Glider

The Hannover glider on which Martens finished third in the long distance contest of the second Rhön meet, and on which he subsequently made a cross country flight of 4.6 miles in 15 min. 40 sec., was built by the flying club of the Hannover technical high school.

This machine is a well streamlined cantilever monoplane, but instead of having the wings flush with the lower longerons of the fuselage like the Aachen glider, the wings are fastened to the upper side of the fuselage, somewhat in the manner of the Fokker F3. From the viewpoint of gliding this arrangement has the advantage that the underside of the fuselage itself is made use of for landing purposes, instead of requiring a separate landing gear, as in the Aachen. To absorb the landing shocks, footballs are mounted around axles under the nose and the center of gravity of the machine. The pilot sits in a cockpit provided in front of the wings. The controls comprise ailerons, elevator and rudder.*

Little remains to be said about the remaining entries in the second Rhön meet. The machines which did not qualify in the eliminatory trials were mostly of more radical designs than the winners. It seems that too many new and untried ideas were embodied in them, which made piloting so difficult that the machines had no chance of demonstrating what they were actually worth. Among the soarers which showed promising features of construction was the Weltensegler, which caused the only fatal accident during the meet when the machine sideslipped in a turn and crashed, killing its pilot, Willy Leusch. The wing tips if this machine were sweptback in the manner of the Dunne airplane, a scheme which answered the purpose of deriving more energy from the wind, and also of assuring longitudinal stability, as the machine was not fitted with a tail.

(To be continued)

* A detailed description of the Hannover glider, together with scale drawings will appear in a forthcoming issue of AVIATION.

Longren Sales Company Formed

A sales company to handle the Longren planes, parts and service, has been organized and chartered for the state of Kansas under the name of the Pioneer Aero Co. Dr. F. C. Stewart, of Eskridge, is president of the sales company; S. K. Beach, Eskridge, vice president; Clayton T. Trivett, Eskridge, secretary-treasurer, and E. B. Lopp, of Topeka, sales manager. Lopp has been flying Longren planes and others for years, and is one of the best known pilots in the state.

The new sales company will be prepared to take over the management of municipal flying fields and the supervision of service stations there.

Organization of similar companies in other states will probably follow the organization of the Kansas company as a result of the demand for the Longren planes which has arisen throughout the United States and other countries.

Curtiss to Build 50 Martin Bombers

The War Department has awarded an order for fifty Martin bombers to the Curtiss Aeroplane & Motor Corp. of Garden City. The award was based on competitive bids, shown in the table below, the Curtiss bid being the lowest.

This order is additional to the one for fifty Martin bombers placed by the War Department with the Curtiss company, which is under way. Thirty-five Martin bombers are under construction for the Air Service at the L.W.F. plant at College Point, L. I.

Manufacturers' Bids for Construction of Martin Bombers

BIDDER		FOB FACTORY "A" Unit Price	FOB FACTORY "A" Total Price	FOB FACTORY "A" Spares	FOB GOV'T FIELD "B" Unit Price	FOB GOV'T FIELD "B" Total Price	FOB GOV'T FIELD "B" Spares	FOB NEAREST FIELD "C" Unit Price	FOB NEAREST FIELD "C" Total Price	FOB NEAREST FIELD "C" Spares	DELIVERIES	DISCOUNT IF INCREASED
Dayton-Wright	25	$22,537.00	$563,675.00	$36,412.50	$22,147.00	$553,675.00	$35,698.59	$21,947.00	$548,675.00	—	12 mos., after receipt all data	
	50	18,670.00	933,950.00	65,292.97	18,279.00	913,950.00	64,012.30	18,079.00	903,950.00	—	14 " "	50 per cent
Glenn Martin	25	28,315.00	707,875.00	44,622.90	26,485.00	662,125.00	44,332.96	26,485.00	662,125.00	—	43 weeks, date contract	
	50	23,925.00	1,196,250.00	78,320.65	22,485.00	1,124,250.00	78,320.65	22,485.00	1,124,250.00	—	45 " "	7½ per cent
Boeing	25	26,860.00	671,500.00	68,347.00	—	—	—	26,860.00	671,500.00	—	12 months, after award	
	50	21,881.00	1,094,050.00	134,887.80	—	—	—	21,881.00	1,094,050.00	—	15 " "	5 per cent
G. Elias	25	19,800.00	495,000.00	35,935.00	—	—	—	19,800.00	495,000.00	—	15 months	
	50	19,750.00	987,500.00	70,345.00	—	—	—	19,750.00	987,500.00	—	20 months	5 per cent
Eberhardt	25	25,331.00	633,275.00	66,402.00	—	—	—	25,000.00	625,000.00	—	9 months	
	50	19,831.00	991,550.00	120,656.00	—	—	—	19,500.00	975,000.00	—	9 months	
Aero-marine	25	20,950.00	523,750.00	36,742.00	20,950.00	523,750.00	37,476.00	20,950.00	523,750.00	—	14 months	
	50	19,950.00	997,500.00	72,377.00	19,950.00	997,500.00	73,825.00	19,950.00	997,500.00	—	15 months	5 per cent
L.W.F. Co.	25	20,676.00	516,917.00	33,920.00	20,676.00	516,917.00	33,962.00	20,676.00	516,917.00	—	11½ mos. after complete inf.	
	50	18,797.00	939,850.00	65,419.00	18,797.00	939,850.00	65,461.00	18,797.00	939,850.00	65,419.00	11½ mos. after complete inf.	
Curtiss	25	17,990.00	449,750.00	39,973.00	17,250.00	431,250.00	39,973.00	17,250.00	431,250.00	39,973.00	8 mos. after receipt dwgs. & Spec.	2 per cent
	50	17,490.00	874,500.00	78,738.00	16,750.00	837,500.00	78,738.00	16,750.00	837,500.00	78,738.00	11 mos. after receipt dwgs. & Spec.	

Death of Colonel Shaughnessy

Second Assistant Postmaster General, Severely Injured in Collapse of Washington Theater, Dies in Walter Reed Hospital

AVIATION is extremely sorry to have to record the death of Col. Edward H. Shaughnessy, Second Assistant Postmaster General, in charge of the Air Mail Service, on Feb. 2 at the Walter Reed Hospital, Washington, D. C. Internal injuries, caused by the collapse of the Knickerbocker Theater, caused the death of Colonel Shaughnessy. His wife and 10-year old son, both of whom were seriously injured in this disaster, are still in the hospital.

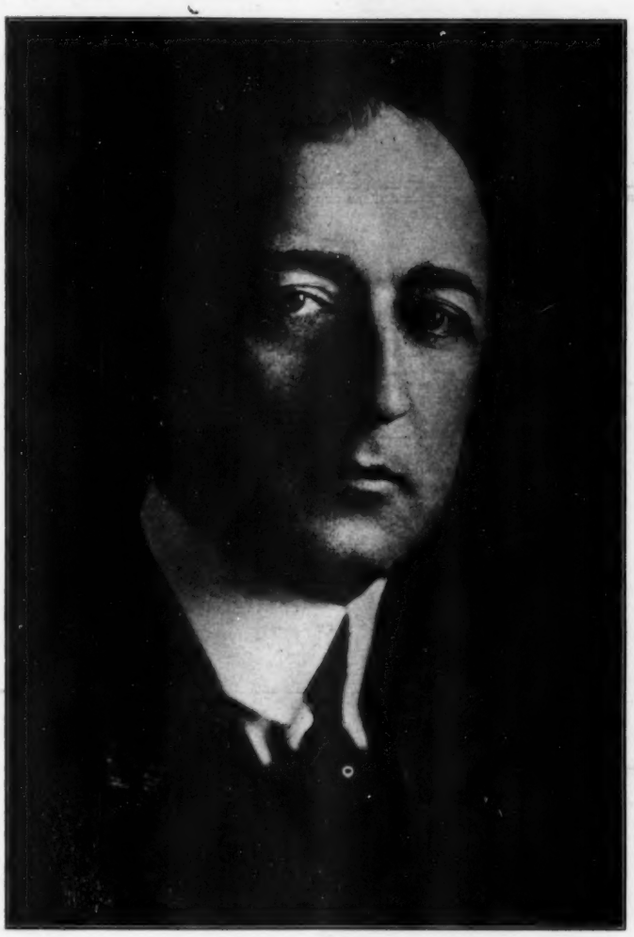
The death of Colonel Shaughnessy comes as a severe blow to the Air Mail Service, which through his efforts had reached a very high degree of efficiency. The seriousness of this loss is voiced by former Postmaster General Hays in a message which says in part:

"Colonel Shaughnessy's death is a terrible loss.

"I have never known a finer man. No one could have been more efficient or more honest in his service."

President Harding issued this statement:

"I was very greatly grieved to learn of the death of Assistant Postmaster General Shaughnessy. The department officials held him in exceedingly high esteem and counted him a most valuable Government servant. Of course, I have shared the views of those who worked in intimate association with him."



The late Col. E. H. Shaughnessy

His Carreer

Colonel Shaughnessy, who was born Oct. 26, 1882, began his active life as a telegrapher on the Chicago & Northwestern Railroad, rising to be trainmaster at Chicago in 1917, when he entered the military service as First Lieutenant in the Thirteenth Regiment of Railway Engineers. He served as superintendent of transportation at Chateau-Thierry, and later was general superintendent of transportation during the St. Mihiel drive. Next he became general manager of transportation in the zone of advance during the Argonne offensive, having been promoted to the rank of Colonel.

For service in France Colonel Shaughnessy was awarded the Distinguished Service Medal with the following citation (War Department G. O. No. 95 July 26, 1919):

"Edward Henry Shaughnessy, Lieutenant Colonel, Transportation Corps, United States Army. For exceptionally meritorious and distinguished services. Serving successively as General Superintendent, General Manager and Acting Deputy Director General of Transportation, by his energy, zeal, and able management he rendered services of the highest type to the Transportation Corps of the American Expeditionary Forces. In the performance of his manifold duties he constantly displayed marked enthusiasm, originality and sound judgment."

In addition he was decorated by the President of the French Republic on Sept. 24, 1919, with the Legion of Honor, for distinguished service rendered to the French forces.

He was especially commended by the General Staff for conspicuous service during critical operations at Chateau-Thierry and also during the St. Mihiel and Meuse-Argonne offensives.

On Jan. 17, 1920, Colonel Shaughnessy was commissioned a full Colonel in the Officers Reserve Corps, Engineer Section, and was further honored in War Department G. O. No. 74, Dec. 16, 1920, by being included in the initial General Staff eligible list which is a selected group of officers who by virtue of meritorious service are declared to be competent for General Staff duty without taking the prescribed course of training that has been outlined as necessary as a result of the late war experience.

Colonel Shaughnessy returned to the United States on Sept. 26, 1919, resuming service with the Chicago and Northwestern Railway and later resigning therefrom to become Assistant Director, Division of Transportation, of the American Petroleum Institute. On April 11, 1921, President Harding appointed him Second Assistant Postmaster General, in which capacity Colonel Shaughnessy became head of the Air Mail Service.

Colonel Shaughnessy was a member of the Executive Committee, Fidelity (New York Elks) Post No. 712, American Legion; of the New York Post, Military Order of the World War; of the New York Post, Society American Military Engineers: of the 13th Engineers Officers Club; and of the American Association of Railroad Superintendents.

Colonel Shaughnessy was Republican in politics but has never been active in political affairs.

Mather Field News

Practical instruction in airplanes and motors is being carried on at Mather Field, particularly in the 28th Squadron, which is being organized and trained for service in the Philippine Islands. In addition to the Radio School maintained by the E. & R. Department, a class of approximately twenty members has started a course in radio which is intended to prepare observers for a prospective Forest Patrol Season. Not only is the receiving and transmitting being furthered, but study of the instruments used is being made with view to developing radio mechanics as well as operators.

"Who's Who in American Aeronautics"

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The biographical sketches of men who are prominent in American Aeronautics are printed periodically in AVIATION. The first series will be shortly published in a more durable form, and revised issues will be published semi-annually to take care of the frequent changes in station of Army and Navy officers, and such other changes as may occur. As errors and omissions are liable to occur in a compilation of this character, interested parties are requested to notify "Who's Who" Editor of the necessary corrections so the record may be kept up to date.

Stanhope Stewart Boggs

BOGGS, STANHOPE STEWART, Air Mail Pilot; born, Tucson, Ariz., April 27, 1895; son of Edward Marshall Boggs and Nell (Sutherland) Boggs.

Educated: Public schools of Oakland and Berkeley, Calif.; private schools; Polytechnic Business College.

Professional: Real Estate; Standard Oil Co., 1915-1917.

Aeronautical Activities: Cadet, Air Service, Sept. 1917; U. S. School of Military Aeronautics, University of California, Feb. 1918; instruction at Kelly Field and Brooks Field and appointed Instructor of Flying at Brooks Field, Aug. 1918; discharged, July 15, 1919 and enrolled as Pilot, U. S. Air Mail Service, Aug. 1, 1920 to date.

Flying Rating: Reserve Military Aviator; certificate, Aero Club of America.

War Service: As above.

Member: Allied Fliers Club, Oakland, Calif.; Air Mail Pilots of America.

Present Occupation: Air Mail Pilot.

Address: Air Mail Field, San Francisco; home, 480 Thorn Road, Oakland, Calif., (P. O. Box 549).

E. Hamilton Lee

LEE, E. HAMILTON, Air Mail Pilot; born, Paris, Ill., April 18, 1892; son of John Thomas Lee and Lucy (Almeda) Lee; married, Veronica Poppy, March 13, 1913.

Educated: Public schools of Iowa and North Dakota.

Professional: Aviation since 1913; flew exhibition until begnning of World War.

Aeronautical Activities: Civilian Flying Instructor, U. S. Army from June 23, 1917 to Dec. 1918; U. S. Air Mail Pilot from Dec. 1918 to date; senior pilot in the service.

Flying Rating: Aero Club of America License No. 2134; Federation Aeronautique International experts certificate No. 188.

War Service: Army Civilian Flying Instructor of acrobatics, June 1917 to Dec. 1918.

Member: Aero Club of Illinois.

Present Occupation: Air Mail Pilot.

Address: U. S. Air Mail Field, Maywood, Ill.; home, 909 Sheridan Road, Chicago, Ill.

Raymond L. Wheeler

WHEELER, RAYMOND L., Commercial Aviator; born, Edison Park, Ill., June 3, 1898; son of Walter R. Wheeler and Maude V. Wheeler.

Educated: Public schools.

Professional: May 1915 to Nov. 1917, auto race driver.

Aeronautical Activities: Dec. 1917, training at Champaign, Ill., Camp Dick, Kelly Field, Rockwell Field and Ream Field; discharged Jan. 1919; exhibition pilot, parachute jumper and plane changing aerial acrobat at present.

Flying Rating: Reserve Military Aviator; Pursuit Pilot, Oct. 1918.

War Service: Air Service, U. S. Army, Dec. 1917 to Jan. 1919.

Member: Aviation Club of Chicago; Illinois Aero Club.

Present Occupation: Commercial aviator and parachute jumper.

Address: 701 Desplaines Ave., Desplaines, Ill.

Elmer George Leonhardt

LEONHARDT, ELMER GEORGE, Air Mail Pilot; born, Cleveland, Ohio, Oct. 19, 1895; son of Theophil Louis Leonhardt and Anna Elizabeth (Remelius) Leonhardt; married, Esther Florence Dewar, June 23, 1921.

Educated: Public schools of Cleveland.

Professional: Installation Exchanges, Western Electric Co. and automobile business, 1914-1917.

Aeronautical Activities: S.M.A., Princeton University; Advanced Training at Gerstner Field; Instructor, Aerial Gunnery and Night Flying, Gerstner Field; Officer in Charge of Aero Repairs and Chief Tester for Eng. Department, Bolling Field; Air Mail Pilot for more than two years.

Flying Rating: Reserve Military Aviator, April 12, 1918.

War Service: Army, June 1917 to Feb. 1919.

Present Occupation: Air Mail Pilot.

Address: Air Mail Field; home, 3302 W. 110th Street, Cleveland, Ohio.

Chance Milton Vought

VOUGHT, CHANCE MILTON, Consulting Engineer; born, New York City, Feb. 26, 1888; son of George W. Vought and Annie(Colley) Vought; married, Ena Lewis, Dec. 4, 1920.

Educated: Public schools of New York City; Pratt Institute, Brooklyn, N. Y.; New York University; Pennsylvania University.

Professional: Consulting Engineer to Harold F. McCormick, Chicago, Ill. and San Antonio, Tex., 1909-1912; Consulting Engineer, Aero Club of Illinois, 1912-1913; Aeronautical Engineer and Pilot, Lillie Aviation School, 1913; Technical Editor and Editor, Aero & Hydro Aviation Weekly, 1914; Aeronautical Engineer, Mayo Radiator Works, 1914-1915; Designing Engineer, Curtiss Airplane & Motor Corp., 1915-1916; Aeronautical Engineer and Designer, The Wright-Martin Aircraft Corp., New York City, 1916-1917; Consulting Engineer and Chairman of the Board, Lewis and Vought Corp., 1917 to date.

Aeronautical Activities: Active pilot, 1911-1917; designer and constructor of PLV Biplane, Mayo Biplane, Simplex 3-Place Flying Boat, Wright Model "V" Military Biplane, Wright-Hispano Flying Boat, Vought VE-7 Standardized Military Training Biplane, VE-8 Single Seater Pursuit Plane, VE-10 Short Hull Type Flying Boat, VE7 Navy Standard Ship's Turret Plane, VE11 Special Puruit Single Seater, 1910-1921.

Flying Rating: International Aircraft Pilot's License No. 156, 1912.

War Service: Consulting Engineer, Bureau of Aircraft Production, Washington, D. C.

Books: Treatises on Aircraft Design and Performance, 1912.

Member: Aero Club of America.

Present Occupation: Consulting Engineer, Lewis & Vought Corp.

Address: Review and Borden Aves., Long Island City; home, 440 Park Ave., New York City.

Charles Hugh Chatfield

CHATFIELD, CHARLES HUGH, Airplane Engineer; born, Waterbury, Conn., Sept. 8, 1892; son of William F. Chatfield and Mary F. Chatfield; married, Grace M. Scofield, Nov. 10, 1920.

Educated: Crosby High School, Waterbury, Conn.; S.B. 1914, S. M. 1915, Mass. Inst. of Tech.; S.M. 1915, Harvard University.

Professional: American Brass Co., Waterbury, Conn., 1915-1916; Waterbury Tool Co., 1916-1917.

Aeronautical Activities: Naval Aviation School, M.I.T., Dec. 1917 to Jan. 1918; Inspector's School, Buffalo, N. Y., Jan. to April 1918; Office of Inspector of Naval Aircraft, U.S.N., College Point, N. Y., April to Sept. 1918; Aeronautical Engineering course at M.I.T., Oct. 1918 to Feb. 1919; Bureaus of Constructon and Repair and Aeronautics, Navy Department, Washington, D. C., Feb. 1919 to Oct. 1921; Wright Aeronautical Corp., Nov. 1921 to date.

War Service: Active duty, U. S. Naval Reserve. Force, Dec. 1917 to Oct. 1921.

Present Occupation: Airplane Engineer, Wright Aeronautical Corp.

Address: 238 Lewis St., Paterson, N. J.; home, 509 Willow St., Waterbury, Conn.

Paul Plunket Scott

SCOTT, PAUL PLUNKET, Aviator; born, Augusta, Ga., Sept. 5, 1894; son of Robert Albert Scott and Nancy (Dunlap) Scott.

Educated: 1912, Tattnall Collegiate Institute, Claxton, Ga.; 1913-1914, Presbyterian College of South Carolina, Clinton, S. C.

Professional: 1914-1917, Traveling Freight Claim Adjuster, International and Great Northern R. R., Houston, Tex.

Aeronautial Activities: Enlisted Fort Myer, Va., Aug. 1917; U. S. School of Military Aeronautics, Princeton, Nov. 1917; France, Dec. 1917 to Nov. 1918 at St. Maxient, Avord and Issoudun.

Flying Rating: Reserve Military Aviator, July 1918; French Brevet, July 1918.

Present Occupation: Pilot, U. S. Air Mail, June 1920 to date.

Address: Commercial Club, Salt Lake City, Utah; home, 1641 R. Street, N. W., Washington, D. C.

William Bushnell Stout

STOUT, WILLIAM BUSHNELL, Aeronautical Engineer; born, Quincy, Ill., March 16, 1880; son of Rev. J. F. Stout and Mary L. (Bushnell) Stout; married, Alma E. Raymond, June 16, 1905.

Educated: Public schools of St. Paul, Minn.; Hamlin University, St. Paul; University of Minnesota, Mechanical Engineering.

Professional: Chief Engineer, Schumeier Motor Truck Co. of St. Paul; Features and Illustrating, Chicago Tribune; Technical Editor, "Motor Age"; Founder and first Editor, "Aerial Age" (Chicago).

Aeronautical Activities: Chief Engineer, Aircraft Division, Packard Motor Car Co., 1916; Technical Advisor, Aircraft Board, 1917; Designer and builder of first internally-trussed plane flown in United States, Dec. 1919.

War Service: Technical Advisor, Aircraft Board, reporting direct to Howard E. Coffin. Later assigned to Dayton, Ohio, Engineering Division of McCook Field, in building of internally-trussed experimental constructions.

Member: Detroit Athletic Club; Aero Club of Amercia; Society of Automotive Engineers; Aviation Country Club.

Present Occupation: President and General Manager, Stout Engineering Laboratories, Inc.

Address: 6282 Beaubien St.; home, 109 Seward Ave., Detroit, Mich.

Samuel S. Brenner

BRENNER, SAMUEL S., Warehouse Business; born, Philadelphia, Pa., June 30, 1894; son of Louis Brenner and Rose Brenner; married, Rose Sklarovitz, 1890.

Educated: Public schools of Philadelphia; Central High School; Army and Navy Academy, Washington, D. C.

Professional: Wholesale grocery business, 1910-1917; Secretary and General Manager, Eastern Warehouse Company, 1919-1920; President, Brenner-Lesh Co.

Aeronautical Activities: Enlisted Nov. 1917; flying cadet, Jan. 1918; training at Princeton Ground School and Camp Dick, Souther and Kelly Fields; completed Dual, First Solo, Second Solo, Acrobatic, Photography, Wireless, Cross-Country and Formation Stages.

Flying Rating: Reserve Military Aviator.

War Service: As above.

Member: Aero Club of America.

Present Occupation: President, Brenner-Lesh Co.

Address: 1305 Arch St.; home, 1522 Lindley Ave., Philadelphia, Pa.

Harry Grant Donaldson

DONALDSON, HARRY GRANT, Civilian Aviator; born, Milford, Iowa, Oct. 18, 1890; son of R. E. Donaldson and Flora B. Donaldson.

Educated: Milford High School.

Professional: Automobile business, 1910-1917; 1915, automobile racing at Indianapolis, Sioux City and Omaha.

Aeronautical Activities: Training at Kelly Field, Dec. 1917 to March 1918; S.M.A., Austin, Tex., March to June 1918; Camp Dick, Carruthers Field and Love Field until discharged in Dec. 1918; civilian flying ever since discharged.

Flying Rating: Reserve Military Aviator.

War Service: Dec. 1917 to Dec. 1918.

Present Occupation: Civilian flying.

Address: Milford, Iowa.

Ward Tunte Van Orman

VAN ORMAN, WARD TUNTE, Aeronautical Engineer; born, Lorain, Ohio, Sept. 2, 1894; son of Richmond G. Van Orman and Christina T. Van Orman; married, Edith L. Black, April 13, 1918.

Educated: Public schools of Lorain, Ohio; B.S. 1917, Case School of Applied Science.

Aeronautical Activities: Motor instructor, Naval Air Station, 1917-1918; Dirigible and Free Balloon instructor, Naval Air Station, 1918-1919; Aeronautical Engineer, Goodyear Tire & Rubber Co., 1919 to date.

Flying Rating: Aero Club Spherical Balloon Pilot License No. 392; Dirigible License No. 77

Present Occupation: Aeronautical Engineer.

Address: Goodyear Tire & Rubber Co.; home, 509 Crosby Ave., Akron, Ohio.

Arresting Gear for Naval Aircraft Carriers

Experiments Now Being Made at Hampton Naval Air Station to Develop Arresting Gear for Flying Deck of U.S.S. Langley

Of late there has been a great deal of discussion concerning the necessity of airplane carriers for the Navy, but many people do not realize that the carrier must be equipped on its flying deck with an arresting gear of such a nature as will facilitate the landing of airplanes. This device must be so constructed as to prevent the airplane from going over the side once it has landed and to bring it to rest within the shortest practicable distance. Naturally such a device must be mounted upon a clear unobstructed deck.

Early Experiments

The solution of the problem of this arresting gear was attempted in this country many years ago, namely when Eugene C. Ely landed on the deck of the U.S.S.Pennsylvania in 1911. The arresting device used at that time was a system of athwartship wires stretched across a temporary deck built up over the stern of the Pennsylvania. Sand bags were attached to the ends of these wires. Trailing hooks suspended beneath the airplane engaged these wires successively as the airplane proceeded along the temporary deck. Consequently the load of sandbags dragged by the plane increased and the plane gradually was brought to rest. Such a device naturally was disadvantageous in that it could not be utilized immediately in connection with the landing of another plane. Various other devices were tried out by foreign governments but without any great success.

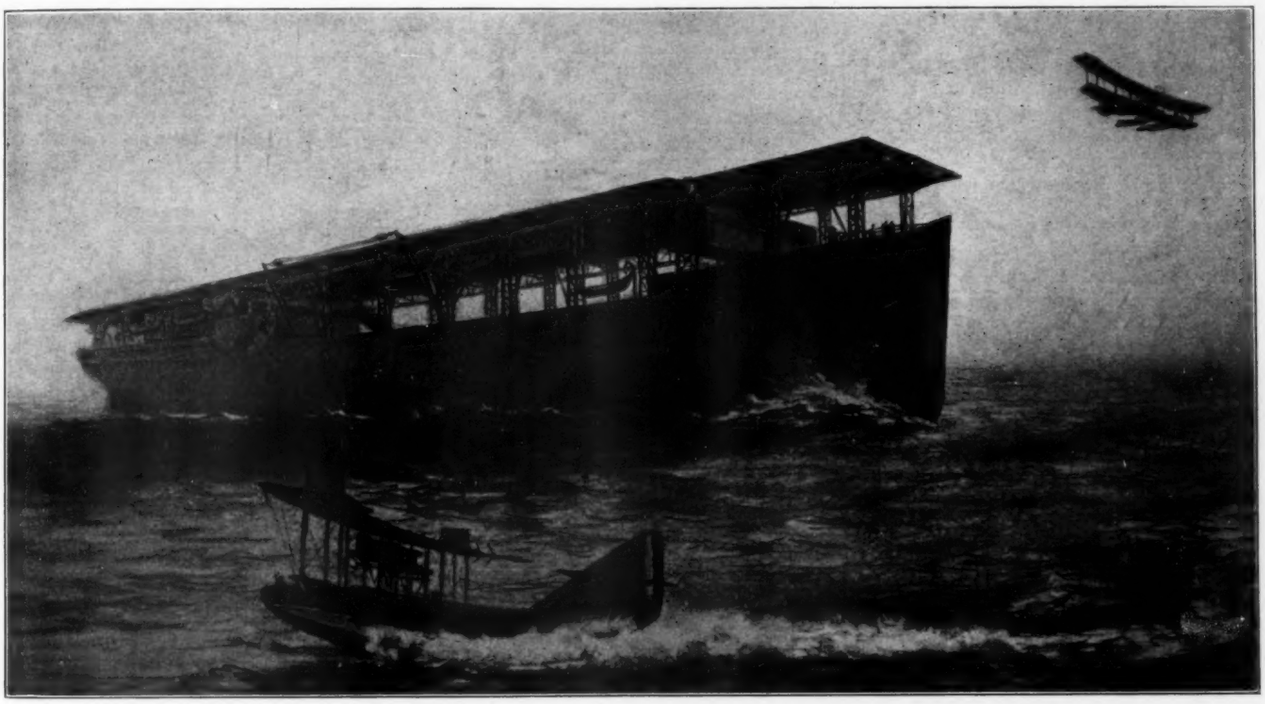
No further progress was made in the development of a solution of this problem until the British Royal Navy brought out their airplane carriers during the war. After much experimentation they have finally evolved a fairly satisfactory arresting gear.

As stated above the problem is more complex than might be thought upon first consideration. In the first place the planes concerned, after touching the deck, must be locked to it in such a manner as to permit of forward movement only. This is to prevent the airplane from rolling over the side, or from being blown over the side, after it loses flying speed and control. Next, the airplane must be brought gradually to rest. This retardation must be gradual as any severe stresses would wreck the airplane and its undercarriage. After the airplane has been brought to rest, means must be provided to prevent a strong wind from blowing it astern. Furthermore, the arresting gear must be capable of being brought immediately "back to battery," or in other words, it must be possible for a second plane to land immediately after the first has been brought to rest and hauled clear.

The Hampton Roads Trials

At present the U. S. Navy is conducting experiments to develop an arresting gear for the flying deck of the U.S.S. Langley. A revolving platform is being built on the flying field at the Naval Air Station, Hampton Roads, Va. On this platform are stretched fore and aft wires six inches apart and about nine inches above the platform. These wires are led up over a ramp on one edge of the platform and extend to the other edge where they go over another ramp. The tendency of the wires to sag is prevented by supporting them at intervals with collapsible boards or fiddle-bridges. The platform is constructed so that it may be rotated in order that the fore and aft wires may be turned into the wind. Under the fore and aft wires are stretched athwart-ship wires to the ends of which are secured sandbags. On the axle of the airplane is attached a row of hooks projecting downward. A trailing hook is secured to the undercarriage. Two other hooks are attached to the tail skid.

In operation, the airplane lands on the flying field and rolls up over the first ramp. It then drops down upon the wires, the wheels rolling between the fore and aft wires. The hooks from the axle engage these fore and aft wires and force the plane to move directly forward into the wind without swerv-



The U.S.S. aircraft carrier Langley, according to a wash drawing of the Navy Department, for which an aircraft arresting gear is being developed at Hampton naval air station

ing. The trailing hook drops between these wires and picks up one or more of the athwartship wires. The sandbags on the ends of these wires immediately exert a drag on the plane which brings it slowly to rest. When the tail drops, the hooks on the tail skid engage in the fore and aft wires thus preventing the airplane from going over on its nose. In case the airplane rolls entirely across the platform it is brought to rest on the far ramp by the action of the axle hooks which are engaged in the fore and aft wires. With the assistance of this device an expert pilot could land on the deck of the Langley with every assurance of not crashing over the side. The ship would be headed into the wind thus reducing the relative speed over the deck of the airplane and facilitating the landing.

With the successfull demonstration of the U. S. Navy catapult for launching airplanes illustrated on the cover, it is now practicable to equip with airplanes the major ships of the fleet. When carriers with arresting devices are available, the battleship airplanes will probably be launched from battleships by means of their catapults, will accomplish their mission, and will land on the decks of the airplane carriers available. Naturally the airplane carriers will operate their own complement of airplanes.

Preparation and Use of Glue

The following extract from Prof. Jenkin's "Report on the Materials of Construction Used in Aircraft and Aircraft Engines" was originally due to Lieut. Kernot, and is issued in the form of a Technical Memorandum for the information of the people concerned:—

Preparation of Glue for Use. The best method to prepare glue for use is to break the cake glue into small pieces (about the size of peas) and to soak them in water at room temperature for 24 hours. The glue in this time will have absorbed enough water to form a solution when heated. Hence, any excess of the soaking water should be thrown away, and the swollen pieces of glue should be transferred to, and melted in the familiar water-jacketted glue pot. The heating or melting process should be conducted as quickly as possible without boiling the water in the glue pot jacket furiously, and the contents of the glue pot should be raised to a temperature between 60 deg. C. and 80 deg. C. (140 deg. F. and 175 deg. F.) when the melted glue should be ready for immedite use. The bigger the "job" the warmer should be the glue(within the above limits). If glue is heated more than about 6 hr., it becomes steadily weaker. Prolonged heating may cause the formation of substances such as Mucin (a non-adhesive), although such products may also be present in a glue owing to its method of manufacture. Hide glues, for example, have this drawback when the hides have not been carefully washed after liming. Stale glue should not be used, and fresh glue should not be added to previously heated glue. Only sufficient glue for the work required should be prepared, and any surplus glue should be thrown away.

Method of Using Glue. The glue solution, once it has become hot, should not be allowed to cool, as remelted glue has not the same tenacity as a freshly prepared solution. Whenever possible the wood should be warmed slightly to avoid chilling the glue. On the other hand the wood must not be too hot, as very hot wood rapidly absorbs the water in the glue, causing the glue to dry too quickly, with the result that a weak joint is obtained.

The faces of the wood to be joined together should be made perfectly true after which, if possible, they should be lightly toothed with a fine toothing plane. The room in which the glueing is done should be at a temperature not below 20 deg. C. and free from draughts. The joint, when made, should be clamped up for at least 12 hr., after which the clamps may be removed, but the joint must be allowed to set at least another 24 hr. before it is subjected to any stress.

It is generally recognized that the quality of a glue joint is very dependent on the experience of the operator: but it may be assumed that the more a glue penetrates into the pores of the wood the more efficient is the joint, always providing that sufficient glue remains between the surface of the wood in order to form the joint. Good penetration is always obtained with glues which do not set too rapidly.

In glueing, great care should be taken to avoid the formation of air bubbles, which are the source of considerable trouble, and frequently cause the failure of a joint. Air bubbles are due sometimes to bad glue brush manipulation, and sometimes to frothing or foaming, objectionable properties which are peculiar to some kinds of glue.

—Canadian Technical Memorandum

THE CONTEST COMMITTEE of the AERO CLUB OF AMERICA

Requests all owners (individuals or companies) of aircraft in the United States to register in order that the Committee may

1. Send, gratis, the Aero Club's Contest Rules for 1922, and notices of proposed aviation meets.
2. Assist local Clubs in organizing contests best adapted to the types of airplanes in their locality.
3. Have a record of airplanes and pilots available throughout the country in times of emergency.

USE THIS FORM.

CONTEST COMMITTEE, AERO CLUB OF AMERICA;
11 East 38th Street, New York City

Date .....

I / We) have ..... (Give number)
(Airplanes)
(Seaplanes)
(Flying Boats)
(Airships)
(Free Balloons)

Make and Model .....

Motor, Make and Model .....

Maximum speed of .....m.p.h.

Capable of continuous flights of ..... miles

Cubic capacity of gas bag ..... cu. ft.

Underwriters' Laboratories Aircraft Registration No. .....

Pilot's name .....

Address .....

Owner's name .....

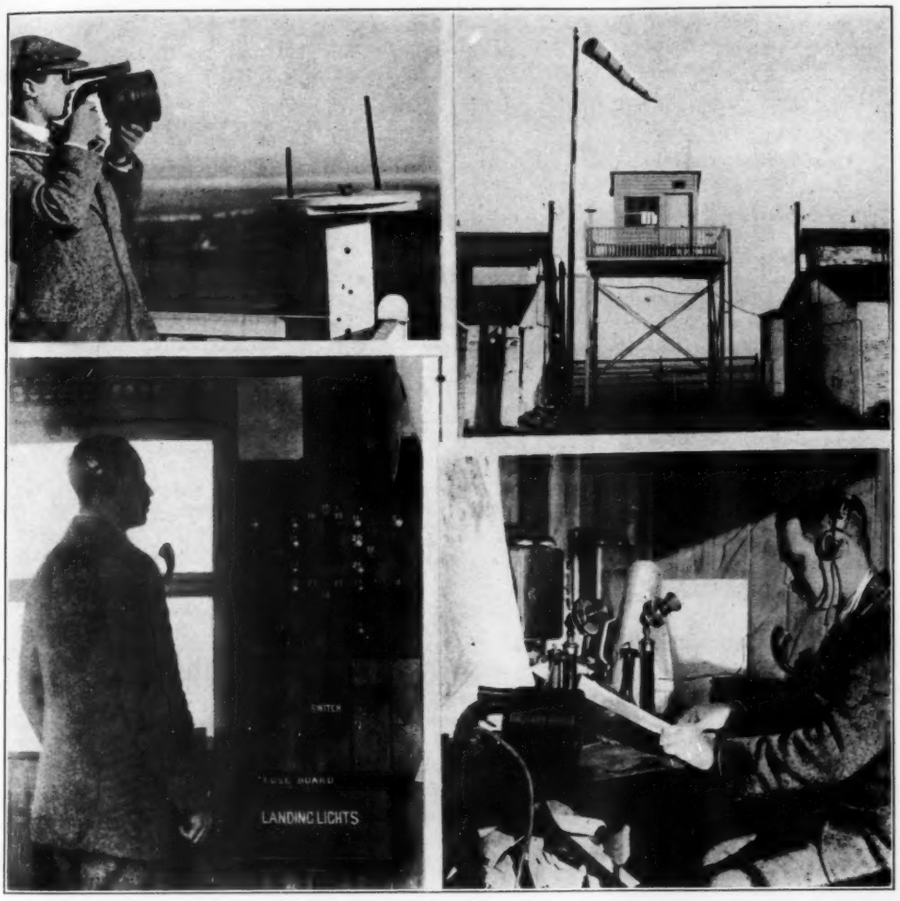
Address .....

Air Traffic Control at Croydon Airport

Interesting Photographs Show How Incoming and Outgoing Aircraft are Directed from Central Control Tower

The photographs below show some details of the air traffic controller's office at Croydon, the airport of London. This establishment is absolutely unique at present but is a model of what we will see all over the world in the near future.

It is the function of the air traffic controller to direct the movements of incoming and outgoing machines. This he does by a variety of means. When the machine is near his tower he employs a megaphone to give the pilot his instructions without the pilot having to come to him for conversation.



The upper left hand view shows the air traffic controller signalling to the pilot of an approaching airplane by means of the special flashlight. At the upper right is shown a general view of the building. The view at the lower left shows the controller giving instructions to an airplane about to land, by means of the landing lights. The wind indicator is seen in the upper right hand corner of the view. The lower right hand view shows the air traffic controller giving information and instructions to an incoming airplane by means of the wireless telephone extension.

When the machine is in the air, and is equipped with a wireless, he employs radio. This method of control requires special apparatus. There is a land line between the traffic controller's office and the airport radio station. The radio operator gets in communication with the machine and then rings up the traffic controller and plugs him in on the line. When a machine is in the air and not equipped with wireless he either signals him by means of Verys lights or by means of a special flash light shown above.

In addition to controlling traffic the airdrome chief is in charge of the navigation lights at the airport. It is his duty to switch on these lights when requested. As shown below, there is a wind indicator inside the tower and the switches have a series of lights sunk in the ground in the middle of the airdrome which are used to indicate the proper directions for landing. Another function of this indispensable official is to keep track of the various machines and keep them supplied with information that they desire.

In the future, large cities will have a very serious problem on their hands in taking care of the air traffic at their air ports. The traffic in the air is comparatively easy to handle, but the landing and taking off represents a very serious problem. During the war at the Army training fields many accidents occurred on the ground due to lack of proper observance to rules and regulations. Unless great precautions are taken, accidents may occur at commercial airports and this will prove a serious detriment to commercial air transport. As is shown by the New York Traffic Control recently installed, central control of the whole traffic is practically essential. Around a city like New York, in the morning and in the evening there will be great congestion from private machines taking people to and from their places of business. These machines will be very difficult to control. The owners of these machines are today using automobiles and they are the principal offenders against the traffic rules. The experience gained at Croydon will prove valuable in the future not only to England but other nations as well.

Dayton-Wright School to Reopen

The Dayton-Wright Co. announces resumption of its training school which was abandoned upon our entry into the late war. Applications for enrollment are being received now for the course of training which is to be inaugurated in May and with a great many improvements, both in the matter of facilities and planes, over anything in the past.

With adequate boarding arrangements, the use of the improved Gosport system, instructor and student sitting side by side in the training plane and each pupil getting individual instruction, a large class is already looking forward to May.

Flying Circus at Crissy Field

A very successful flying circus was staged on the Marina Field, San Francisco, last month by the Crissy Field organization. Thousands of people attended.

"Jinx" Jenkins, an aerial acrobat of moving picture fame, jumped from one plane to another at a height of 1500 ft. while the crowds below stood spellbound. Capt. Lowell Yerex piloted the stunt plane. Then came a tug of war between an Army plane and an Army motor truck, with the air machine victor.

The feature of the program was the parachute jump of "Jinx" Jenkins from a plane soaring at 3000 ft. The parachute, known as the Hardwick "safety pack," was designed for Army aviators by Charles Hardwick, of San Francisco, a member of the local Air Service Reserve Squadron. In its use it proved very successful. Circling high above the field, Jenkins was piloted to the 3000 ft. level by Captain Yerex. When over the water of the bay, off the Marina, Jenkins jumped. Then gracefully, the umbrella-shaped parachute descended while Jenkins did aerobatic stunts on the bar of the chute. A southern wind first took him out further over the waters of the straits and a lifesaver's motor boat started in pursuit. Then, caught in a northerly current of air, the descending parachute came gliding in toward the Presidio and he landed in the waters of the surf.

The demonstration was held under the supervision of Maj. H. H. Arnold, Air officer of the 9th Corps Area, and Maj. George H. Brett, commanding officer of Crissy Field. The direction of the meet was under Ivan R. Gates. Among those who participated were Lieuts. Eugene C. Batten, John W. Benton, B. S. Catlin, W. C. Goldsborough, H. A. Halverson, E. C. Kiel, F. D. Hackett, A. G. Liggett, A W. Maxwell, Leo F. Post, Robert E. Selff and Capt. Lowell Yerex and "Jinx" Jenkins.

A number of the officers and cadets from Mather Field aided in the circus.

New Airplane Compass

A satisfactory type of airplane compass has been invented by Doctors Paul R. Heyl and Lyman J. Briggs of the Bureau of Standards, of the Department of Commerce. Flying tests with this instrument have been made, and the Air Service is now engaged in putting a number of models into service. The instrument weighs only 13 lb., while the weight limit set by the air service was 25 lb.

The new compass depends for its action not on a magnetic needle, but upon a revolving coiled wire. This principle is by no means new, but it has remained for the Bureau of Standards to apply it in such a way as to make the device practically operative under the very severe conditions prevailing in actual flight.

The problem of perfecting a satisfactory aircraft compass was given the Bureau of Standards about a year ago. At the end of the war no completely satisfactory compass had been devised. Its importance to aviation is apparent when it is remembered that no airplane compass heretofore perfected has been able to keep up with the evolutions of a plane. Whenever the plane turned rapidly, or was stunted, compasses were not reliable. The result was that many pilots lost their lives by losing all idea of direction. Several of the air mail pilots have been killed because of the lack of a satisfactory compass.

New Sport Monoplane

A two seater monoplane with a wing span of 25 ft. and a 60 hp. engine is being built in Colorado Springs by Montee Cave, inventor and aviator. Cave says the plane can be landed at a speed of 15 m.p.h., It will take the air at 20 m.p.h. and will have a maximum speed of 75 m.p.h., Cave says. The plane will be completed by spring. If successful Cave expects to start an airplane factory.

Curtiss Activities

Besides completing the original twin-engined torpedo plane which has recently been undergoing Navy tests, the Curtiss Aeroplane & Motor Corp. is at present very active in other directions. They have about completed the tooling-up for their order of fifty Martin Bombers and are well along in the construction of parts. Recently the firm shipped to McCook Field a single wing of internally braced thick construction which is fabricated of duralumin and steel. This wing is now undergoing tests.

In the commercial line, a Seagull flying boat is being reconstructed for the CD12 385 hp. Curtiss engine. The wings of this model will be of the "one-and-a-half" type, the smaller lower wing carrying side pontoons. The company is also thoroughly overhauling a Handley Page 10-passenger cabin machine with two 375 hp. Rolls Royce "Eagle" engines. It is the intention of the company to thoroughly test out this machine and to perhaps place it in commercial operation later in the season.

Plans have also been completed for a low-priced small commercial three-seater fitted with an OX5 engine, all parts of which will be interchangeable. These machines are to be put in production within a short time. Designs have also been prepared for other and larger passenger and transport machines.

Central New England Flying Field

In addition to the airdrome to be established at East Boston, Maj. Gen. Edwards, commanding general, 1st Corps Area, is anxious to obtain ground for a central New England flying field. This field is desired in order to provide a central point for the military air forces in time of war. This field will be sufficiently far away from the sea coast to be reasonably safe from any attack by an enemy at sea or on the coast.

In time of war this field would act as a central control point for all the fields located in that corps area. This field will in no way displace the Boston Airdrome in time of peace but will be a military field entirely with the exception that civil machines will be able to use the field as an emergency landing field under regulations to be promulgated by the Chief of Air Service.

Governor's Island Airdrome

Governor's Island, in New York harbor, which prior to the entry into the war by the United States was used as an airdrome by the National Guard, is again to be turned into an airdrome. During the war the island was used as an Army storage depot, the area available for landing being covered with sheds. These sheds are now to be dismantled and a flying field established anew.

The airdrome is to be established by the Army Air Service for the use of the reserve squadrons of the New York National Guard. In accordance with a recent ruling by the Adjutant General, the Army is authorized to throw open such airdromes for the use of civil aviators. The central location of Governor's Island makes of it an ideal airport for New York.

A Genuine Photograph

The cover illustration of the Dec. 26, 1921, issue of AVIATION, which showed a close-up view of the Sport-Farman in flight, has elicited an anonymous note addressed to W. Wallace Kellett, representative in this country of Farman airplanes, which note put in doubt the genuineness of the photograph in question.

For the information of the anonymous correspondent and other possible doubters we wish to say that this photograph was taken over Philadelphia, Pa., on or about May 20, 1921 by Mr. Bonnick of the Aero Service Corp., who would be glad, we are sure, to testify to this effect. The photograph from which this illustration was made may be inspected in the office of AVIATION.

A Partial Vacuum Airship

At the last Paris Aero Show an unusual type of airship was exhibited in scale model form. This airship, which is the invention of the Rumanian engineer Vaugean, with whom is associated the Italian engineer Garuffa, is based on the principle by which lift can be derived from a partial vacuum created within the envelope.

The difficulty of building an envelope capable of withstanding the enormous pressures caused by a vacuum, even if only partial, is acknowledged by the inventors, but they claim to overcome it by the use of three concentric envelopes in which the air is rarefied in a growing degree toward the interior, whereby each envelope withstands only the difference in pressure between the two "rings spaces." According to *L'Aérophile*, the pressure on the outer envelope is calculated at 1504 kg. per sq.m., that on the intermediate envelope 2494 kg., and that of the inner envelope 3498 kg. The air in the envelopes is heated by the exhaust of the engines to a temperature from 95 to 130 deg. C. The outer envelope is of fabric, while the intermediate and inner envelopes are of duralumin, and all are stiffened internally by an elaborate framework of duralumin.

The power plant is to consist of four 300 hp. 9 cylinder two-cycle engines built to the designs of Prof. Garuffa, which are to be driven by kerosene or by heavy oil. An engine of this type is said to have turned on the test stand for 28 hr, and to have developed its rated horsepower. Each engine will drive a propeller of 16.5 ft. diameter, and the maximum speed of the airship is expected to be about 80 m.p.h.

The engines will also be employed for creating in the envelopes the partial vacuum from which lift is to be derived, and for this purpose four Rateau "turbo-aspirators" are connected with the engines. These "turbo-aspirators" are also to be used in descents for driving air into the envelopes and for compressing the air therein. Each envelope is divided into nine air-tight compartments, so that should one of these leak or be damaged, the ship would only lose 1/50 of its lifting force. In case the entire outer envelope should be destroyed the ship would only lose 1/5.8 of its lifting force, so that it could still float.

A full sized ship of this type is said to be under construction at Naples. It will have a capacity of 2,824,000 cu. ft., a length of 400 ft., and a master diameter of 100 ft. Passenger accommodation for 110 passengers is to be provided on board.

U. S. Helium Supply

Officials of the Bureau of Naval Aeronautics take exception to the statement that all the world's helium supply was contained in the naval airship C7, claiming that there still remains stored in the United States over a million cubic feet.

The total capacity of the C7 is between 175,000 and 200,000, and some of the gas will be lost in deflating the envelope and compressing the helium into cylinders again. The bulk of the used helium will be transferred to the Army Air Service for experimental purposes, particularly to test the Army's new purification plant which is being completed at Langley Field. One purpose of inflating the C7 with this rare gas, it was explained by Naval aviation officers, was to test the maneuverability of the ship and to make available some used helium so that re-purification experiments could be made. A small amount of the used gas will also be shipped to the testing laboratory of the Bureau of Mines at Washington, D. C., for experimental work with a small charcoal purification apparatus installed there.

Naval lighter-than-air experts are pleased with the first experiments undertaken with helium as a buoyant gas, and state that the brief service of the C7 for this purpose exceeded their expectations. After deflating the airship the Navy plans to fill her again with hydrogen and put her in regular flying service as she was before the helium experiment was made.

If it is found that helium can be used, purified and used again, the high cost of manufacturing this gas from natural gas, which has all but precluded its use in large quantities may be overcome.

Naval Aviation Orders

The following are the latest orders of the Navy Department relating to movements of commissioned aviation personnel:

Lieut. Comdr. James C. Montfort, Det. Naval Air Station Pensacola, Fla., to Air Squadrons, Atlantic Fleet; Lieut. (j.g) Donald J. McCalman, Det. Naval Air Station Hampton Roads, Va., to Duty U.S.S. Maryland; Lieut. (j.g.) Clarence E. Wardell, Det. Naval Air Station Pensacola, Fla., to conn. f. o. U.S.S. Salinas and on board when commissioned; Ens. Paul Carle, Det. Naval Air Station San Diego to U.S.S. Nevada; Ens. Caleb J. Coatsworth, Det. Naval Air Station San Diego to U.S.S. Texas; Ens. Joseph H. Gowan, Det. Naval Air Station San Diego to U.S.S. Oklahoma; Ens. Phil L. Haynes, Det. Naval Air Station Anacostia, D. C., to duty U.S.S. Delaware; Ens. Wallace B. Hollingsworth, Det. Naval Air Station San Diego to U.S.S. Mississippi.

Lt. Comdr. Karl F. Smith, Det. Naval Inspector of Enginering Material, Cincinnati, Ohio, to General Inspector of Naval Aircraft, Central Dist., McCook Field, Dayton, Ohio; Lieut. Paul E. Gillespie (Cl-5), Det. Naval Air Station, Hampton Roads, Va., to Naval Air Station, Anacostia, D. C.; Lieut. (j.g.) Ralph M. Parsons (Cl-5) Det. Naval Training Station, Great Lakes, Ill., to Naval Air Station, Anacostia, D. C.

Lieut. Logan O. Ramsey, Det. Naval Air Station, Pensacola, Fla., to Air Squadrons Atlantic Fleet; Lieut. Lester B. Hutchinson, Det. U.S.S. New Mexico to Air Squadrons Pacific Fleet; Ens. Arnold M. Perkins, Det. Naval Air Station, Pensacola, Fla., to home.

Navy Aviator's Experiences while Adrift

In his report to the commandant, U. S. Naval Air Station, Pensacola, Fla., on Oct. 27, 1921, just made public, Lieut. A. M. Darby, U.S.N.R.F., gives an account of the movements of the R6L, Seaplane No. A893, during fifty-one hours of drifting in heavy seas in the Gulf of Mexico. when the plane ran out of gasoline.

The plane, en route from New Orleans to Burwood, when within ten minutes of Burwood, was forced to land in the gulf, the supply of gasoline having run out. Immediately upon landing an anchor was thrown out, but due to the heavy sea, high wind and shortness of line, it broke out of the soft mud and although it caught several times, the surges of the sea broke it loose.

After fifty-one hours of drifting, in which time about ninety miles were covered, the U.S.S. Allegheny came to the rescue. "The Allegheny threw us a line, then sent a raft over, and we were taken on board," Lieutenant Darby said. "The plane was made secure for towing, and we returned to Pensacola."

Coming Aeronautical Events

AMERICAN

Apr. 30 — ***Spring Show and Opening Meet, Curtiss Field, Mineola, L. I.***

May — ***National Balloon Race.***

Sept. 4 *(about)* — ***Detroit Aerial Water Derby, Detroit. (Curtiss Marine Flying Trophy Competition.)***

Sept. 15 *(about)* — ***Detroit Aerial Derby, Detroit. (Pulitzer Trophy Race.)***

Sept. 30 — ***First Annual Interservice Championship Meet. (In preparation.)***

FOREIGN

Aug. 1 *(about)* — ***Coupe Jacques Schneider. (Seaplane speed race.) Italy, probably Venice.***

Aug. 6 — ***Gordon Bennett Balloon Race, Geneva, Switzerland.***

Oct. 1 — ***Coupe Henri Deutsch de la Meurthe. (Airplane speed race.) France.***

American elimination trials, if required, to be held about Aug. 15, at Mitchel Field, L. I.

Foreign News

China

Air Service officers returning from leave in North China report conditions ideal for the development of aviation. North China has great areas of level open country. Fortunately for aviation, the Chinese live in communities, so their mud houses are not scattered over the country side, but collected in small groups behind a stone wall. Graves of the millions of Chinese dead are scattered promiscuously over the country side and obstruct many othewise perfect sites. They also reported weather conditions ideal in Peking and Shanghai during the months of October and November.

France

In his report on the air budget M. Bouilloux-Laffont points out the extraordinarily small percentage of accidents in French commercial aviation.

In the period from Jan. 1 to Nov. 30, 1921, on aerial lines whose point of departure is in France 1,672,000 miles have been covered, and 16,166 passengers, irrespective of pilots and mechanics, have been transported. Only ten accidents have been recorded, involving the death of seven passengers and four pilots, while only two passengers and three pilots have been injured. These figures give an average of one killed in every 2300 and one injured in every 8083 passengers carried.

Great Britain

Regular service across the English Channel by air will take place this winter for the first time in aviation history . The London *Daily Chronicle* states that arrangements have been made between the Instone and Handley-Page lines to fly six days in the week from both Paris and London. Machines will leave Paris and London simultaneously, pass in mid-Channel, and arrive at their destinations about 2:30 p. m. This will avoid night flying and will be the first time that such extended winter facilities have been afforded the public. Last winter the service of the Handley-Page Company was only twice weekly.

Road surveying by airplane is an innovation shortly to be introduced by the Ministry of Transport. The experiment is to be carried out in connection with the new London to Southend road. The idea is to get maps of the whole of the proposed course for the road. It is estimated that the actual time occupied in photographing the course will be less than 30 min., which will effect a considerable saving of time and expense, for instead of numbers of men having to tramp the country, two or three men will merely have to fly over the course taking a series of photographs as they go. When the photographs are laid side by side it should be possible to have before one a bird's eye view of the whole of the site for the proposed road.

"Outspinning the Spider"

An American industrial romance of wire rope and cable, as developed and perfected by John H. Roebling and his sons from 1831 to date, is told in a pamphlet by John K. Munford, recently published. In mentioning Roebling, the popular mind reverts at once to the Brooklyn Bridge made possible by his genius. But wire rope and cable is now interminably woven into the life and industrial development of the world. In war the Roeblings supplied uncounted thousands of tons first to the allies, and then to the United States. Of special interest to the aircraft field is the fact that beginning with the experiments of the Wrights the Roeblings have been the principal source of aircraft strand wire, and it was their special knowledge that gave to the allies and the United States an enormous production of this material for their training and combat aircraft.

The brochure is in keeping with the prestige of the House of Roebling and is an excellent addition to the industrial literature of the times.

Where to Fly

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